

WHAT IS CLAIMED IS:

- 1 1. A power source comprising:
2 at least one non-radioactive power source; and
3 at least one radioactive power source in electrical communication with said at
4 least one non-radioactive power source, said at least one radioactive power source
5 comprising:
6 at least one junction of a first material and a second material, wherein said
7 first material has a first electrochemical potential and said second material has a
8 second electrochemical potential, wherein said first and second electrochemical
9 potentials are different; and
10 at least one radiation source.
- 1 2. The power source of claim 1, wherein said at least one radioactive power
2 source maintains a charge associated with said at least one non-radioactive power source.
- 1 3. The power source of claim 1, further comprising a power conditioning
2 circuit interposed between and in electrical communication with said at least one non-
3 radioactive power source and said at least one radioactive power source.
- 1 4. The power source of claim 3, said power conditioning circuit further
2 comprising a power management circuit.
- 1 5. The power source of claim 1, further comprising a pair of power source
2 outputs and a power conditioning circuit, said power conditioning circuit interposed
3 between and in electrical communication with said at least one non-radioactive power
4 source and said pair of power source outputs.
- 1 6. The power source of claim 1, wherein said at least one junction is selected
2 from the group consisting of homo-junctions and hetero-junctions.
- 1 7. The power source of claim 1, wherein said at least one junction is a metal-
2 oxide-semiconductor structure.

1 8. The power source of claim 1, wherein said at least one radioactive power
2 source is a beta cell.

1 9. The power source of claim 8, wherein said beta cell is comprised of an
2 icosahedral boride semiconductor.

1 10. The power source of claim 1, wherein said at least one non-radioactive
2 power source is selected from the group consisting of zinc-carbon batteries, zinc-chloride
3 batteries, magnesium batteries, aluminum batteries, alkaline-manganese dioxide batteries,
4 mercuric oxide batteries, silver oxide batteries, zinc-air batteries, lithium batteries, solid-
5 electrolyte batteries, magnesium water-activated batteries, zinc/silver oxide batteries,
6 thermal batteries, lead-acid batteries, iron electrode batteries, nickel-cadmium batteries,
7 nickel-metal hydride batteries, nickel-zinc batteries, nickel-hydrogen batteries, silver
8 oxide batteries, rechargeable lithium and lithium-ion batteries, rechargeable
9 zinc/alkaline/manganese dioxide batteries, metal-air batteries, zinc/bromine batteries,
10 sodium-beta batteries and lithium/iron sulfide batteries.

1 11. The power source of claim 1, wherein said at least one non-radioactive
2 power source is a capacitor selected from the group consisting of metal-oxide-
3 semiconductor (MOS) capacitors, metal-dielectric-metal capacitors, and semiconductor-
4 dielectric-semiconductor capacitors.

1 12. The power source of claim 1, wherein said at least one non-radioactive
2 power source is a fuel cell.

1 13. The power source of claim 12, wherein said fuel cell is selected from the
2 group consisting of hydrogen-oxygen fuel cells, metal hydride fuel cells, chemical
3 hydride fuel cells, and methanol fuel cells.

1 14. A semiconductor package comprising:
2 a package substrate;
3 a plurality of pins attached to said substrate;
4 a plurality of package leads in electrical communication with said plurality of
5 pins;

6 at least one non-radioactive power source mounted to said semiconductor
7 package; and
8 at least one radioactive power source mounted to said semiconductor package and
9 in electrical communication with said at least one non-radioactive power source, said at
10 least one radioactive power source comprising:
11 at least one junction of a first material and a second material, wherein said
12 first material has a first electrochemical potential and said second material has a
13 second electrochemical potential, wherein said first and second electrochemical
14 potentials are different; and
15 at least one radiation source.

1 15. The semiconductor package of claim 14, further comprising an IC
2 mounted to said package substrate and in electrical communication with said plurality of
3 package leads.

1 16. The semiconductor package of claim 14, further comprising a power
2 conditioning circuit interposed between and in electrical communication with said at least
3 one non-radioactive power source and said at least one radioactive power source.

1 17. The semiconductor package of claim 16, said power conditioning circuit
2 further comprising a power management circuit.

1 18. The semiconductor package of claim 14, further comprising a pair of
2 power source outputs and a power conditioning circuit, said power conditioning circuit
3 interposed between and in electrical communication with said at least one non-radioactive
4 power source and said pair of power source outputs.

1 19. The semiconductor package of claim 14, wherein said at least one
2 radioactive power source is a beta cell.

1 20. The semiconductor package of claim 19, wherein said beta cell is
2 comprised of an icosahedral boride semiconductor.

1 21. The semiconductor package of claim 14, wherein said at least one non-
2 radioactive power source is selected from the group consisting of zinc-carbon batteries,
3 zinc-chloride batteries, magnesium batteries, aluminum batteries, alkaline-manganese

4 dioxide batteries, mercuric oxide batteries, silver oxide batteries, zinc-air batteries,
5 lithium batteries, solid-electrolyte batteries, magnesium water-activated batteries,
6 zinc/silver oxide batteries, thermal batteries, lead-acid batteries, iron electrode batteries,
7 nickel-cadmium batteries, nickel-metal hydride batteries, nickel-zinc batteries, nickel-
8 hydrogen batteries, silver oxide batteries, rechargeable lithium and lithium-ion batteries,
9 rechargeable zinc/alkaline/manganese dioxide batteries, metal-air batteries, zinc/bromine
10 batteries, sodium-beta batteries and lithium/iron sulfide batteries.

1 22. The semiconductor package of claim 14, wherein said at least one non-
2 radioactive power source is a capacitor selected from the group consisting of metal-oxide-
3 semiconductor (MOS) capacitors, metal-dielectric-metal capacitors, and semiconductor-
4 dielectric-semiconductor capacitors.

1 23. The semiconductor package of claim 14, wherein said at least one non-
2 radioactive power source is a fuel cell.

1 24. The semiconductor package of claim 23, wherein said fuel cell is selected
2 from the group consisting of hydrogen-oxygen fuel cells, metal hydride fuel cells,
3 chemical hydride fuel cells, and methanol fuel cells.

1 25. The semiconductor package of claim 14, wherein said semiconductor
2 package is selected from the group consisting of DIPs, PQFPs, SIPs, ceramic flatpacks,
3 PIN packages, SOIC packages, QSOPs, LCC packages, and PLCCs.

1 26. The semiconductor package of claim 15, further comprising a substrate,
2 wherein said IC and said at least one radiation power source are each fabricated on said
3 substrate.

1 27. The semiconductor package of claim 14, further comprising a radiation
2 shield substantially containing said at least one radiation power source.